AirUnity588 User Guide
Dense Air

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0.2	June 2021	Updates and addition of Multi-Cell
1.0	June 2021	First issue
1.1	Jan 2022	AU 588 CBRS and Australia
1.2 – 1.3	March 2023	Removed Australia version + added caution
1.4	May 2023	Table 1 was corrected

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UK WEEE Registration number: WEEE/AB0207WZ. For more information, see WEEE Information for Airspan Customers and Recyclers.

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1 About This Document

1.1 Purpose

This User Guide is intended as an instruction manual for professionals to provide step-by-step instructions for setting up and initial configuration of the AirUnity 588 unit.

1.2 Intended Audience

This guide is intended for persons who are responsible for installing and performing initial configuration of the AirUnity 588 unit.

2 Warnings and Cautions

2.1 Human Exposure to Radio Frequencies

To comply with FCC RF exposure compliance requirements, the device should be located at a distance of at least 20 cm (7.87 in.) from all persons during normal operation. The antennas used for this product must not be co-located or operated in conjunction with any other antenna or transmitter.

3 AirUnity 588 Installation

Note: The optimal window placement for the AirUnity 588 is the side of the building with a direct line of sight to the nearest cell tower

The AirUnity 588 unit is placed on the window sill to receive the signal from outdoors and boost it indoors. The following steps instruct on the proper positioning and setup of the AirUnity 588 unit for optimal service.

3.1 Unpacking and Checking the Unit

1. Carefully unpack the AirUnity 588 unit from the box.
2. Inspect the unit for any damage and check that all the accessories are in the box.
3. Remove the Power Supply (included) from the packaging

3.2 Finding the Best Location

- Choosing an appropriate window at the suitable side of a building is vital to get the best performance
- The AirUnity 588 has a built-in capability to survey the 4G signal from suitable provider cell towers & also use GPS to accurately determine it's location. It can do this for multiple windows in the same or on multiple floors, ideally in all four directions of the building.
    - Connect the power supply to the underside of the AirUnity 588 and place it at the 1st window (ideally in the middle of the window).

Note: After 1 minute, the unit will automatically commence the test, with a 30 sec countdown timer

    - Wait for the RF survey to complete
    - Go to the next window and repeat the survey process
    - Test as many windows as possible, in all four directions if possible
    - Once you finish testing all locations, select the best location out of all surveyed locations and press "Install Here" in the location

Note: After 1 minute (in good RF conditions - otherwise after 5 minutes) the unit will automatically commence the installation, with a 30 sec countdown timer.

4 Initial Setup

The AirUnity 588 turns on automatically when the power supply unit is connected to the underside of the unit and plugged in.

1. Place the AirUnity 588 near a window and verify that the unit is positioned correctly so that the display faces into the room.

Note: Choose windows that are in close proximity to an available power supply outlet.

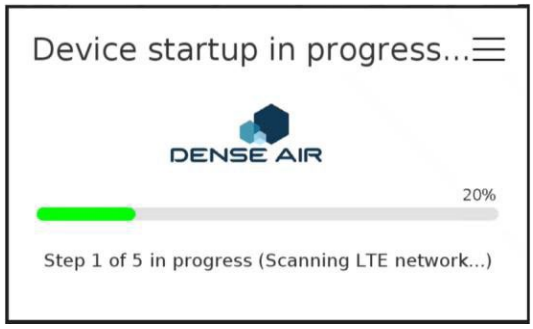
Note: When deploying the unit select a location raised above the windowsill for optimal connection to the network.

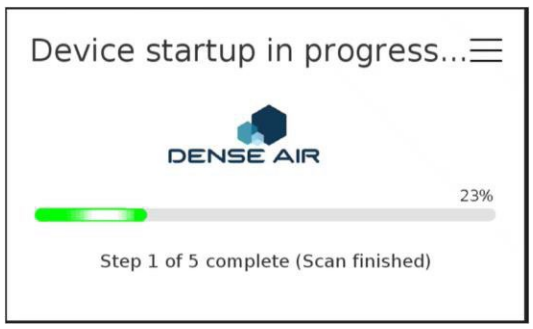
2. Shortly after the application of power, the following will be displayed while the unit is starting up.

Figure 1 Start-up

Note: This process can take several minutes.

The AirUnity 588 scans for LTE backhaul

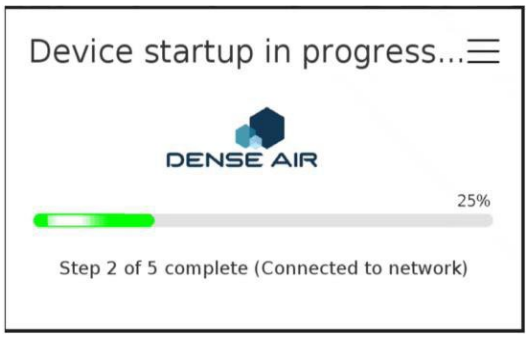


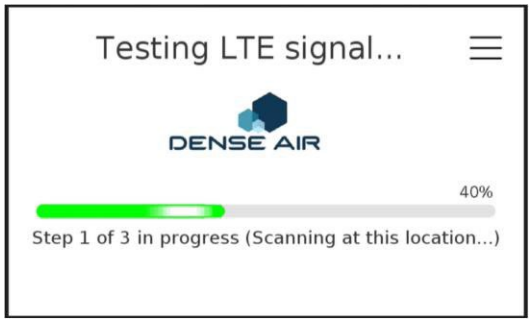


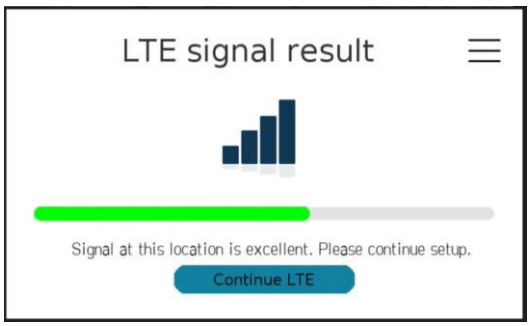
Note: At this point (scan finished), it is possible to access the Cell ID and RSRP of the strongest Donor Cell detected during first frequency scan i.e. before Plug-and-Play is complete. Press the hamburger icon and enter network settings to reach the LTE Backhaul status screen.

Please note: this may not be the same cell as acquired when plug-and-play is complete.

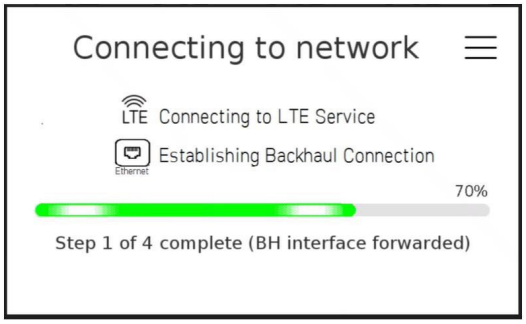
Allowing the device startup to continue without interrogating Cell information:

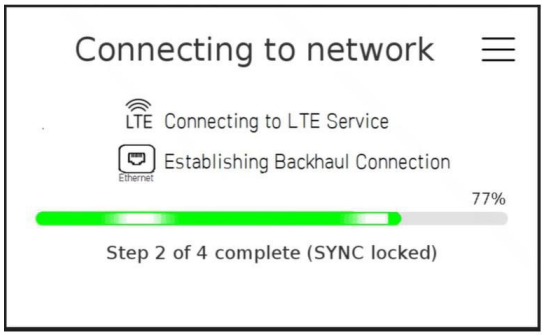


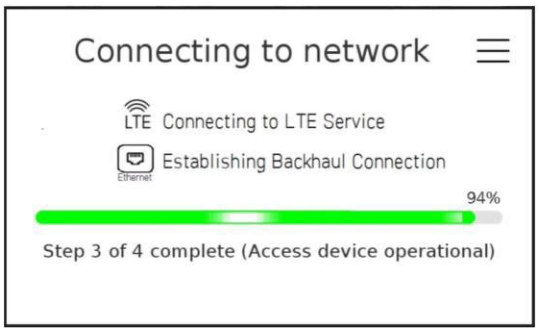




The default setting for the AirUnity 588 is LTE backhaul.



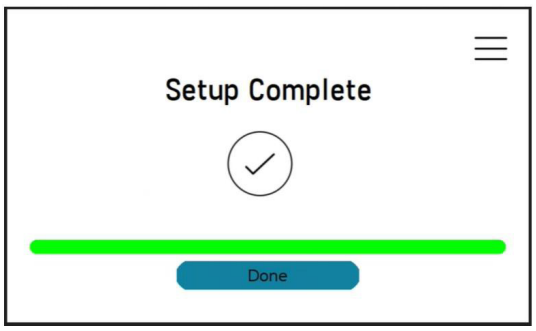




Wait while the connection process progresses.

After several minutes, the “Setup complete” screen will be displayed, as shown below:

Figure 2: Setup Complete – Ethernet



After a while, the “Setup complete” screen will disappear and the Network Status screen is displayed momentarily, followed by the Home screen as shown below:

Figure 3: Network Status

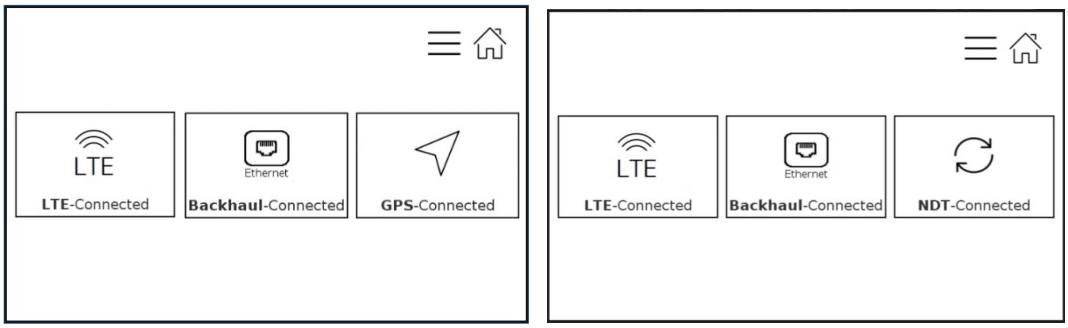
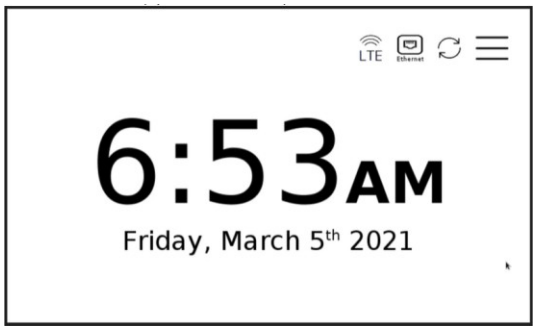


Figure 4: Home screen



Tapping the background of the Home screen will take you back to the Network Status page (above).

Tapping the Menu icon (hamburger) will take you to the General Setting page.

Tapping either of the icons will take you to status page of that particular service.

4.1 Backhaul Selection - Ethernet

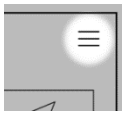
AirUnity 588 supports LTE and Ethernet backhaul connections.

Note: Wired backhaul is the default setting

Selecting the backhaul type is performed on the Setup screen as follows:

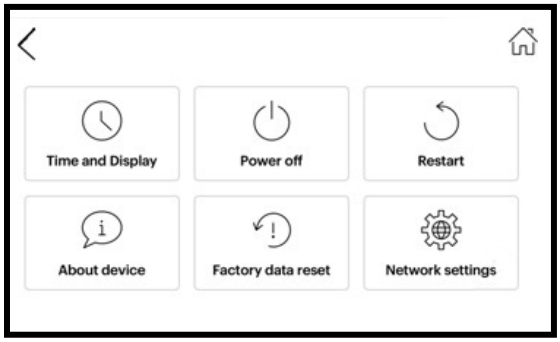
1. Press the menu button (hamburger icon) which appears in the top right of the screens (as shown below).

Figure 5: Configuration Icon



You will be taken to the General Settings page, as shown below:

Figure 6: General Settings



2. Press Network settings and select Ethernet Backhaul from the (drop-down) list of choices.

Note: As soon as a selection is made the AirUnity 588 will reboot to effect the changes.

3. After a few minutes the device starts connecting to the Network. Wait while the connection is established.

Note: This process can take several minutes.

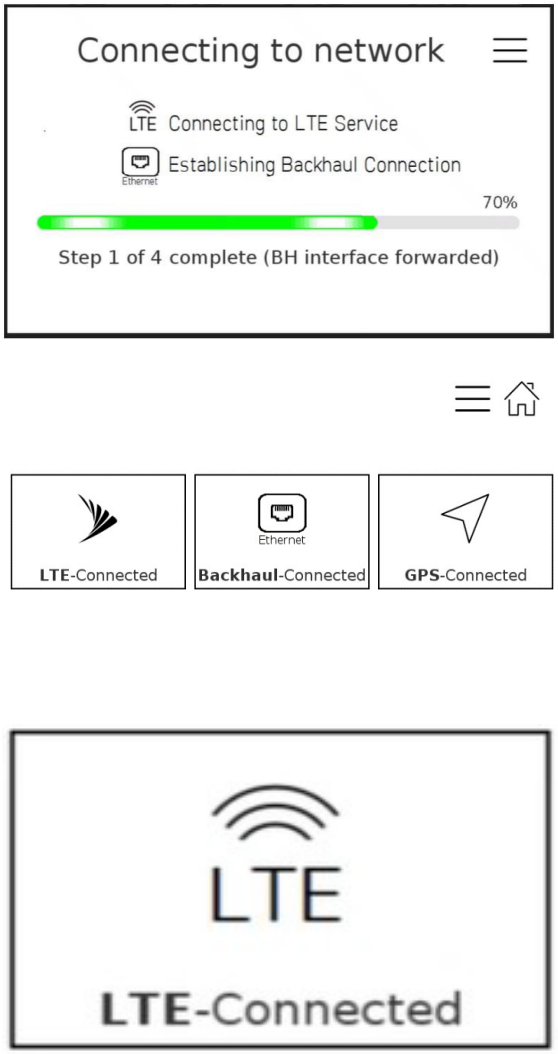
4. Follow the user interface progress displayed while the unit is connecting.

Figure 7: Startup in Progress - Ethernet

Note: This process can take several minutes.

5. Wait while connection and configuration process continues. The following is displayed:

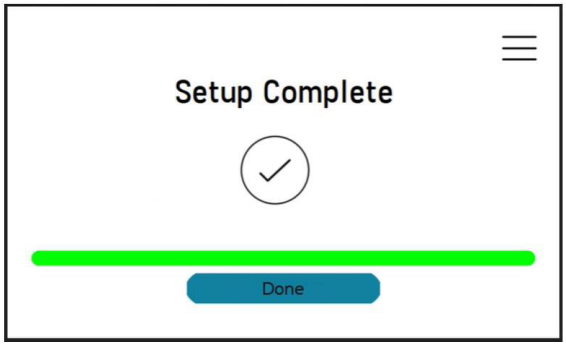
Figure 8: Connection Process - Ethernet



Wait while the connection process progresses.

After several minutes, the “Setup complete” screen will be displayed, as shown below:

Figure 9: Setup Complete – Ethernet



After a while, the “Setup complete” screen will disappear, showing the clock screen indicating the normal operation of the unit. Momentarily the Network Status appears displaying network connectivity, as shown below.

Figure 10: Network Status

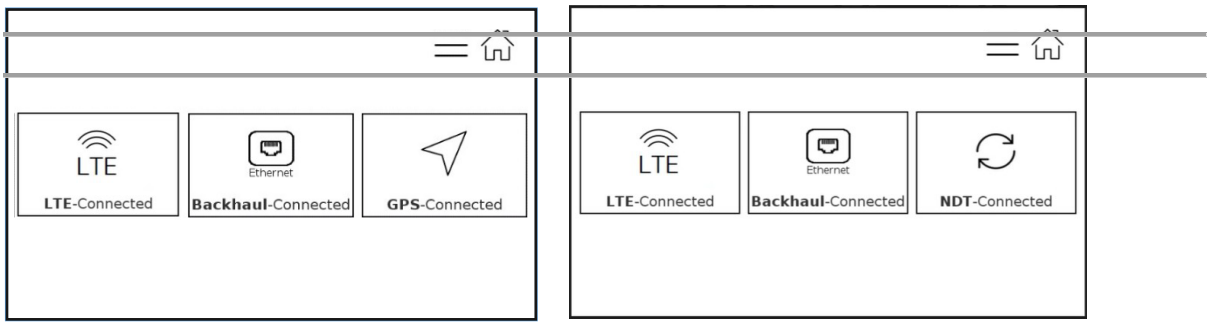
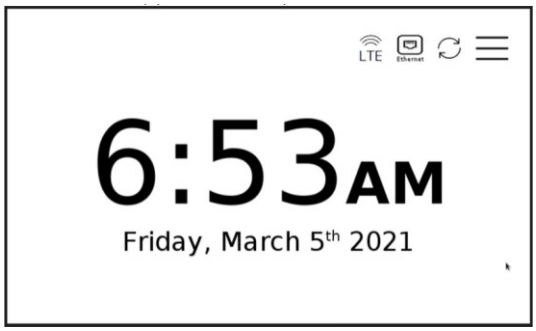


Figure 11: Home screen



Tapping the background of the Home screen will take you back to the Network Status page (above).

Tapping the Menu icon (hamburger) will take you to the General Setting page.

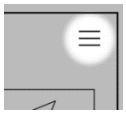
Tapping either of the icons will take you to status page of that particular service.

4.2 Backhaul Selection – LTE

Selecting the backhaul type is performed on the Setup screen as follows:

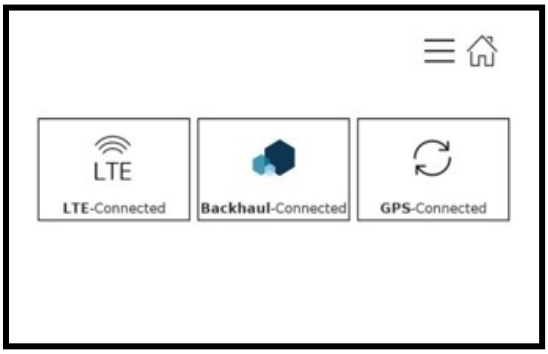
6. Press the menu button (hamburger icon) which appears in the top right of the screens (as shown below).

Figure 12: Configuration Icon



You will be taken to the General Settings page, as shown below:

Figure 13: General Settings



7. Press Network settings and select LTE Backhaul from the (drop-down) list of choices.

Note: As soon as a selection is made the AirUnity 588 will reboot to effect the changes.

8. After a few minutes the device starts connecting to the Network. Wait while the connection is established.

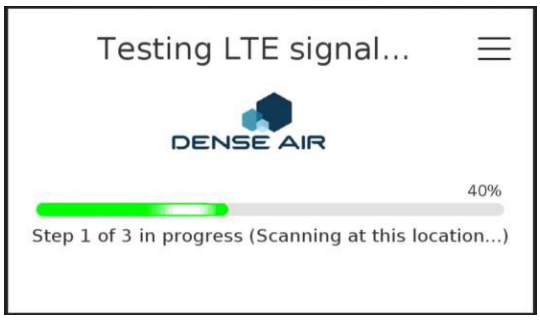
Note: This process can take several minutes.

9. Follow the user interface progress displayed while the unit is connecting.

Note: This process can take between 5 and 15 minutes depending on the strength of the network at the installation location.

The following is displayed:

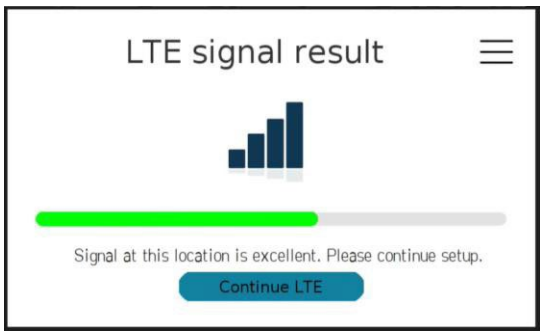
Figure 14: Testing Signal



After several minutes, when signal test is complete, you will be given the option to accept the current location or test another location. At every test position you can choose to “Continue” to proceed with the installation, or “Retry” to test next window for better signal quality.

The following screen(s) will help you determine the final installation location.

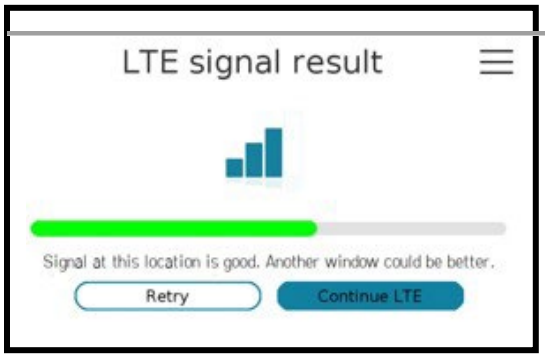
Figure 15: Scan Rating: High



Note: This window provides sufficient signal quality, other factors such as proximity to power outlet might influence you to try another window position if needed.

10. Check the results and reposition if required.

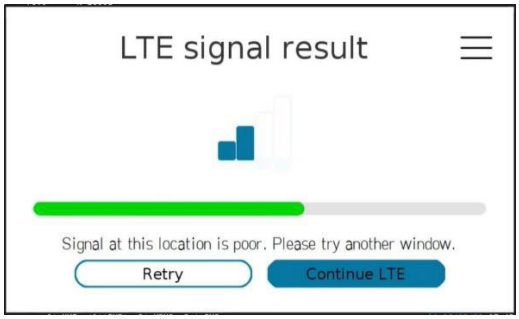
Figure 16: Scan Rating: Medium



11. Check the results, signal at this location is good. Another window could be better. Click Retry or Continue.

Note: Test another window for a better signal quality, if possible.

Figure 17: Scan Rating: Low



12. The signal at this location is poor. Please try another window. Click Retry or Continue.
13. If signal is not detected, the AirUnity 588 will display the following screen:

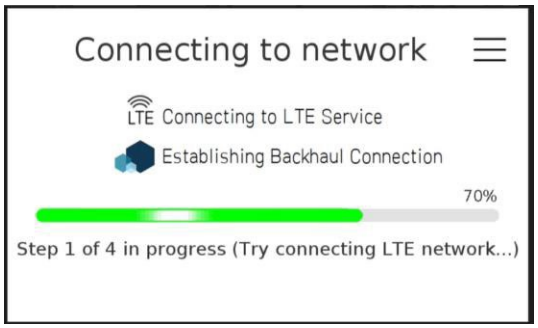
Figure 18 No signal detected

Note: Check the results, compare and place the unit on the best window position if needed.

14. Once you have determined the correct window placement based on the rankings move the AirUnity 588 to the selected window and continue. The device will start again, showing the startup screen.

15. Wait while connection and configuration process continues. The following is displayed:

Figure 19: Connection Process - LTE



16. Wait while the connection process progresses.

After several minutes, the “Setup complete” screen will be displayed, as shown below:

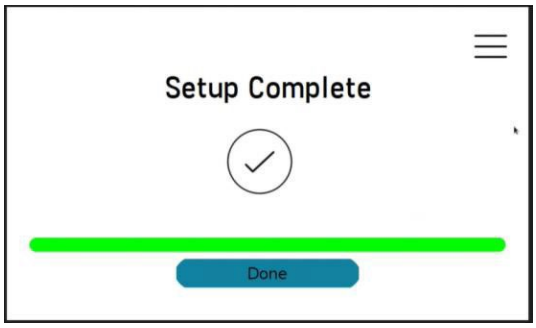


Figure 20: Setup Complete - LTE

If the AirUnity 588 fails to complete initialisation at any point during the process, there is a supervisory timer which expires and the following screen is displayed:

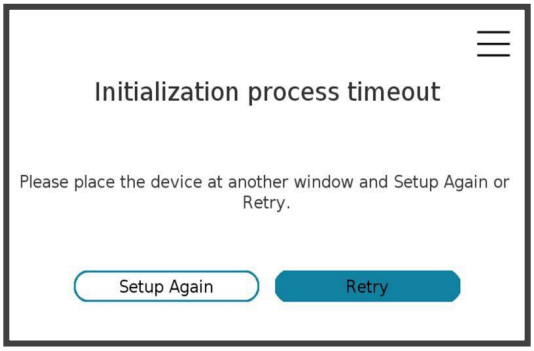


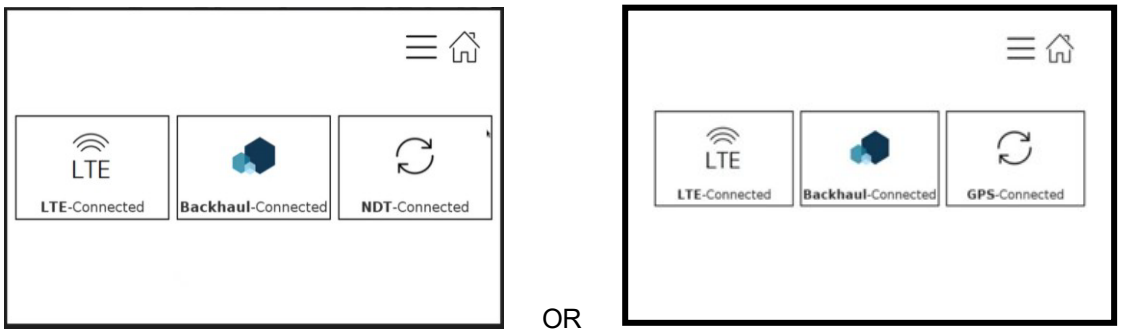
Figure 21 Failure to Initialize

The causes of initialization failure may be:

- No SIM
- SIM present but Donor eNB could not be found
- Donor eNB found but SIM not provisioned
- Donor eNB found but APN not provisioned for SIM
- SIM and APN provisioned but PnP profile not present in NMS (Netspan)

Once Setup is complete, the Network Status screen displays the Access service, Backhaul connection and synchronisation source (Donor-Macro Network-Derived-Timing OR GPS) as shown below.

Figure 22: Network Status

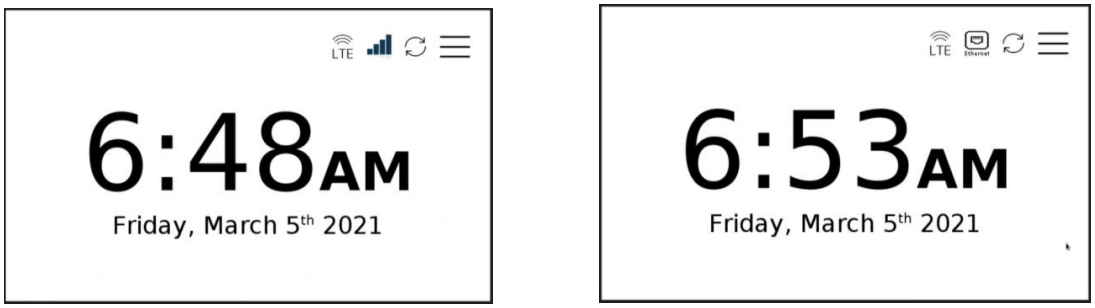


Sync source NDT

Sync source GPS

Note: For more information on the connection Status, see Section 6

The AirUnity 588 then displays the Home screen.



LTE Backhaul

Wired Backhaul

Figure 23: Home Screen – LTE Backhaul and Ethernet Backhaul

There are Two Home Screens available, dependent upon which Backhaul is being used i.e. LTE Backhaul (wireless) or Ethernet Backhaul (wired)

From the Home screen:

1. Tapping the LTE Icon will take you to the LTE Access status (includes Cell ID)

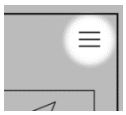
2. Tapping the Icon will take you to the LTE BackHaul Status page.
3. Tapping the Ethernet Icon will take you Ethernet Backhaul Status page
4. Tapping the Icon will take you to the Synchronisation Status page (either GPS or NDT).
5. Tapping the Icon will take you back to the Network Status page

5 Network Settings

Switching the backhaul type is performed on the “Network Settings” page.

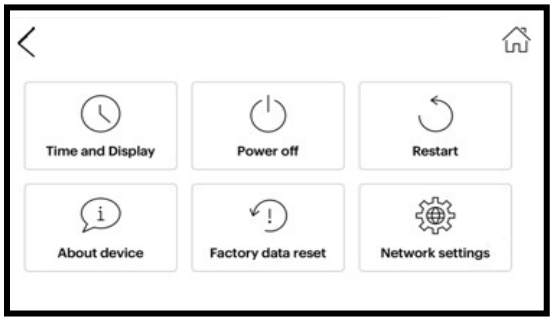
1. Press the “hamburger icon” which appears in the top right of most screens (as shown below).

Figure 24: Configuration Icon



You will be taken to the General Settings page, as shown below:

Figure 25: General Settings



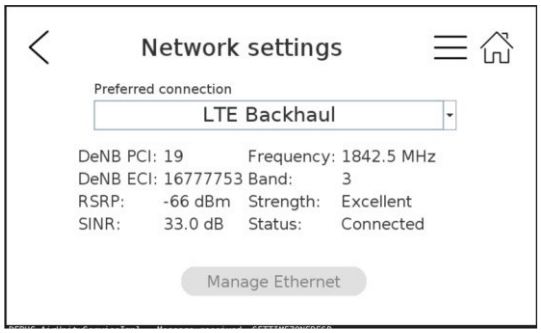
1. Press Network settings and select from the (drop-down) list, either:
   - LTE Backhaul
   - Ethernet Backhaul

Note: As soon as a selection is made the AirUnity 588 will reboot to effect the changes.

5.1 LTE Backhaul

Select LTE Backhaul, the following is displayed:

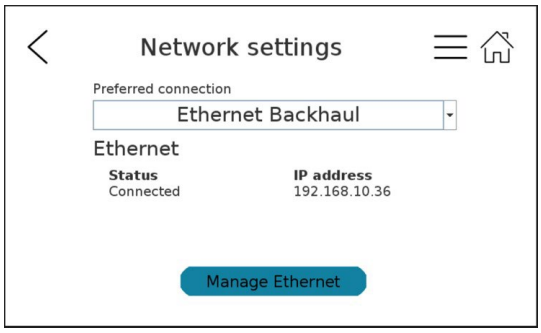
Figure 26: Network Settings - LTE Backhaul



5.2 Ethernet Backhaul

1. Select Ethernet Backhaul, the following is displayed:

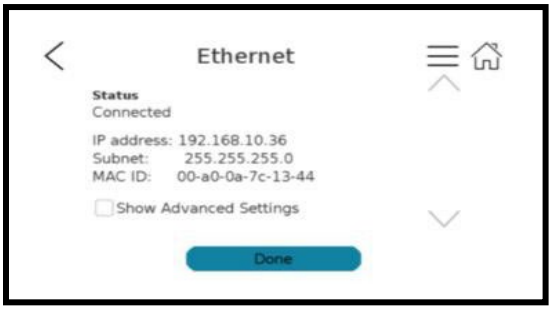
Figure 27: Network Settings - Ethernet Backhaul



Note: To enable Ethernet backhaul, simply select the Ethernet backhaul option in the “Network Settings” page and connect an Ethernet cable to a DHCP enabled, Internet connected access point/ router.

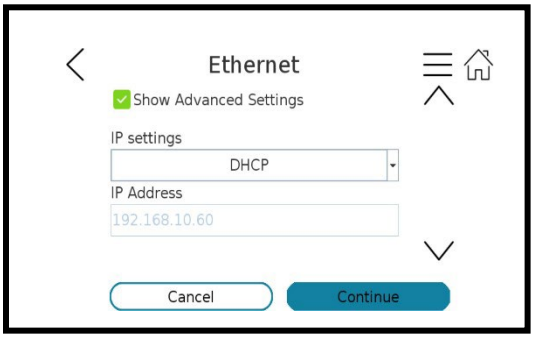
2. Press “Manage Ethernet”, the following is displayed:

Figure 28: Network Settings - Ethernet Status

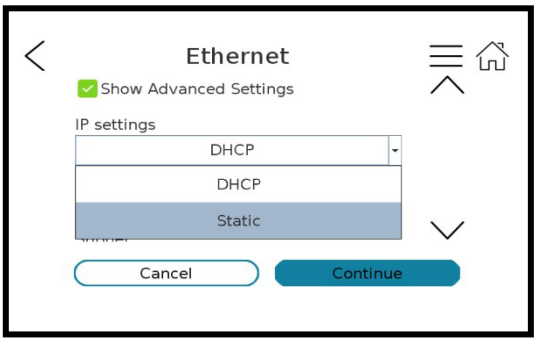


3. Click “Show advanced settings” checkbox to display additional information, as shown below:

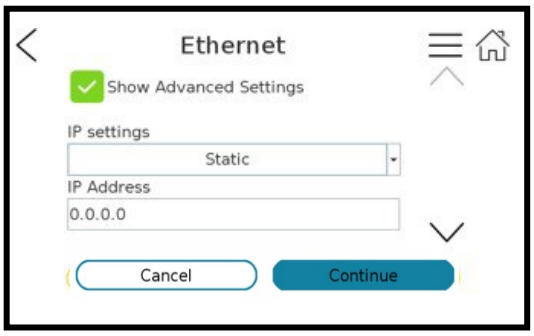
Figure 29: Network Settings - Ethernet Status Advanced Settings



Selection of the IP Settings box opens up a drop-down menu for selection of DHCP or Static IP address

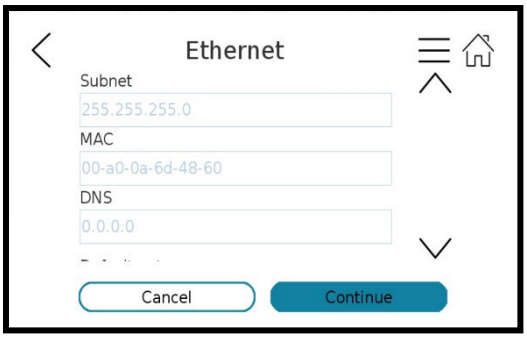


Selection of Static allows manual input of IP address

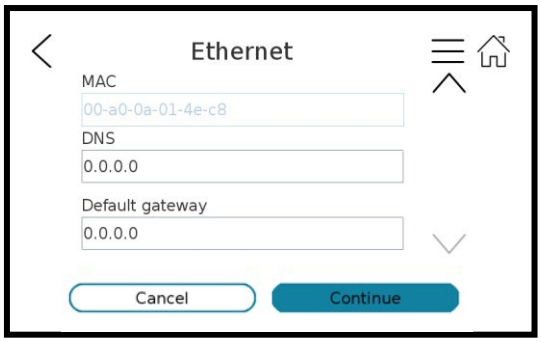


Selection of the IP Address text box opens a keyboard screen for entry of static IP values

Press scroll buttons for more settings and apply parameters (all fields are mandatory).



Press scroll buttons for more settings (all fields are mandatory).



6 MultiCell status

The AirUnity588 supports MultiCell operation and has wo sectors on the Access (eNB) side, termed Indoor and Outdoor sectors. Each sector can operate in the following manner, configured via Netspan:

- Both sectors on a single channel with the same Tx Power setting: Lite-CoMP configuration
- Both sectors on independent LTE channels with independent Tx Power Settings (up to the maximum permissible Tx Power for each): Multi-Cell
- Indoor Only Sector
- Outdoor Only Sector

Presentation of the status of sectors in operation is provided by the LTE Icon on the Home screen as follows:

Indoor Cell Status	Outdoor Cell Status	eNodeB status	top right corner icon	Dashboard Icon	Dashboard text display
In service	In service	Connected	LTE	LTE	LTE-Connected
In service	Out of service	Part connected	LTE	LTE	LTE-Part Connected
Out of service	In service	Part Connected	LTE	LTE	LTE-Part Connected
Out of service	Out of service	Disconnected	LTE	LTE	LTE-Disconnected

7 General settings

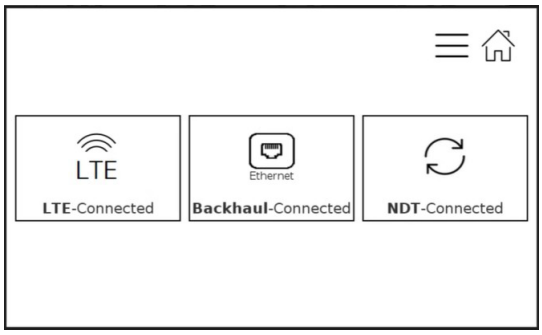
The following section describes how to access the configuration screens in order to:

- Change the Screen Brightness and Time Format
- Access More Information
- Power Off & Restart
- Factory Data Reset to Clear Configuration

To access Configuration settings:

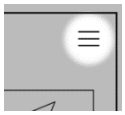
1. Press the clock screen to see the status screen.

Figure 30: Status Screen



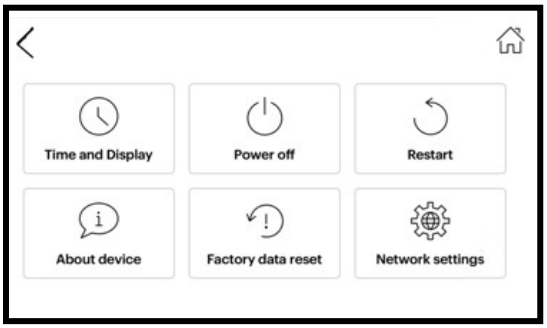
2. Select the Configuration icon (Hamburger icon) to reveal the menu – found on the upper right-hand corner

Figure 31: Configuration Icon



You will be taken to the General Settings page, as shown below:

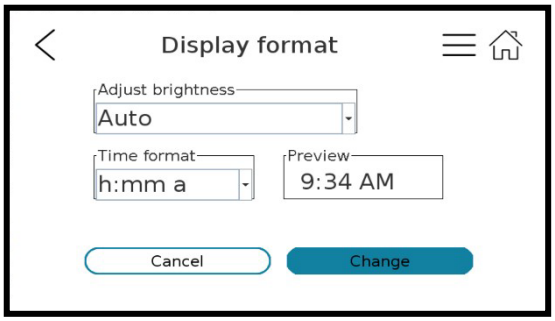
Figure 32: General Settings



7.1 Change Display Format

Select “Change Display Format” – to change the time format and Adjust brightness

Figure 33: Change the Time Display Format



- Select “Cancel” to go back
- Select “Change” to save the change made to the time format

7.2 About Device

Select “About device” – this is how you can find out the current software version

Figure 34: About Device

- Select “Got It” to go back

7.3 Power Off

If you want to power off the unit, press “Power off”

Figure 35: Power Off

7.4 Factory Data Reset

1. To repeat the installation of the device (e.g. to change the window where the device is installed) and reset the device configuration, press “Factory data reset”.

Figure 36: Factory Data Reset

At this point, the option to proceed with Factory Reset is hidden, in order to avoid inadvertent selection which will erase operational configurations within the AirUnity.

The screen definition is 800x480. A hidden touch button is located at co-ordinates in the range of x (145--185) & y(230--270) as illustrated below:

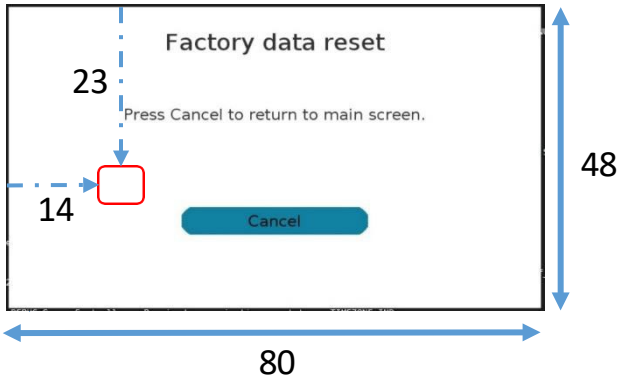


Figure 37 Location of hidden button for factory reset

Pressing the screen in the area of the hidden button will take you to the following screen:

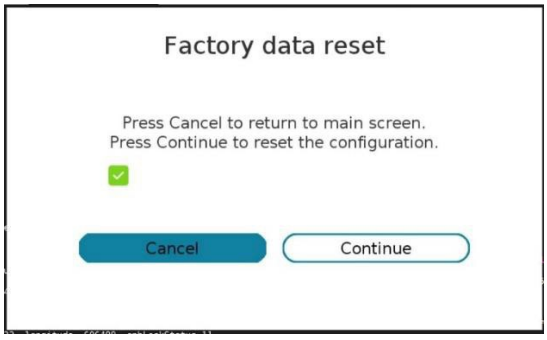


Figure 38 Factory reset non-hidden screen

From this screen:

1. Select “Continue” – to reset the configuration to factory defaults
2. Select “Cancel” – to go back

7.5 Restart

If you want to restart the unit press “Restart” on the Menu Screen

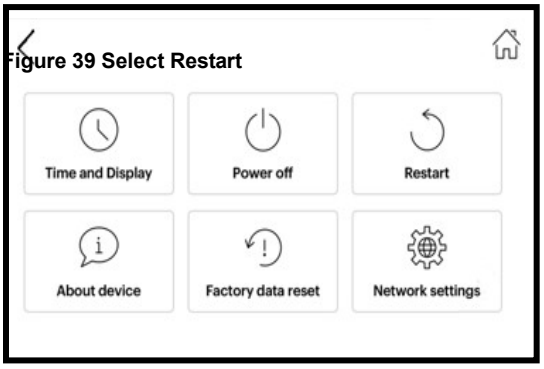


Figure 39 Select Restart

The Air Unity 588 will commence re-boot and display the following “Restart” screen:

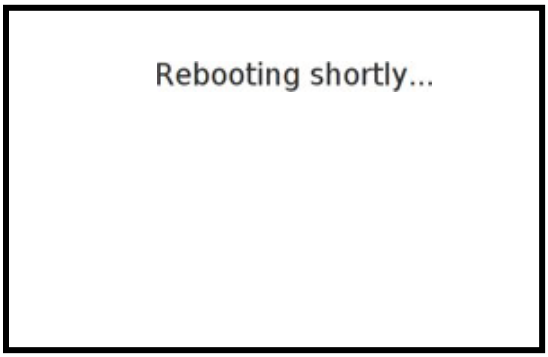


Figure 40 Restart in progress

8 Status

The following section describes how to access the status screens to view additional status information. Closing the Status screen takes you back.

When there is an issue with any of the elements such as: LTE connection, Backhaul status, Sync status, the Clock screen will display a “Status” warning.

8.1 LTE Access Status

From the Home screen, select the LTE status icon to view the connection status and additional information.

Home screen

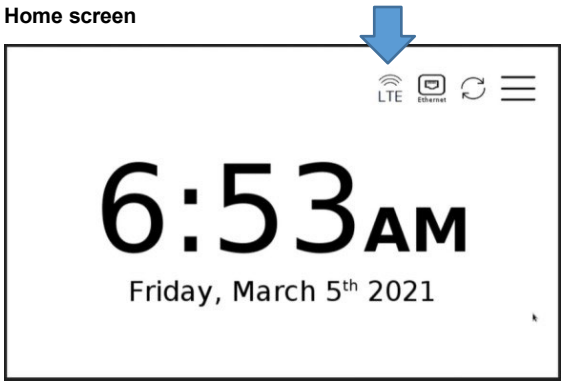


Figure 41 Home screen

Selection of LTE displays the following when Sync source is NDT

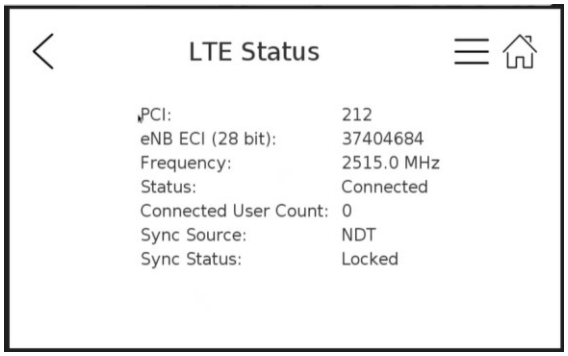


Figure 42 LTE Access status with NDT sync

Selection of LTE displays the following when GPS is Synchronisation source

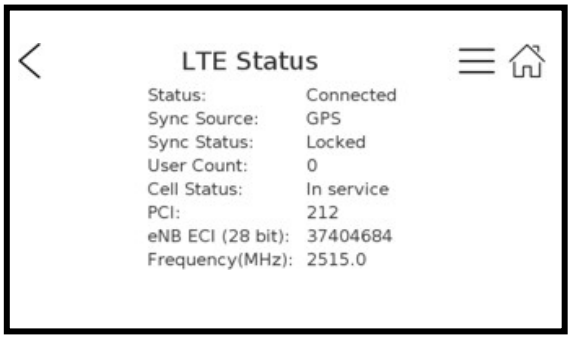


Figure 43 LTE Access status with GPS sync

2. Press either:
   - Back (Arrowhead icon) – to return to previous page
   - Menu (Hamburger icon) – to return to menu
   - Home

8.2 Backhaul Status

From the Home screen, select Backhaul Status Icon (Ethernet or LTE dependent upon Backhaul in use)

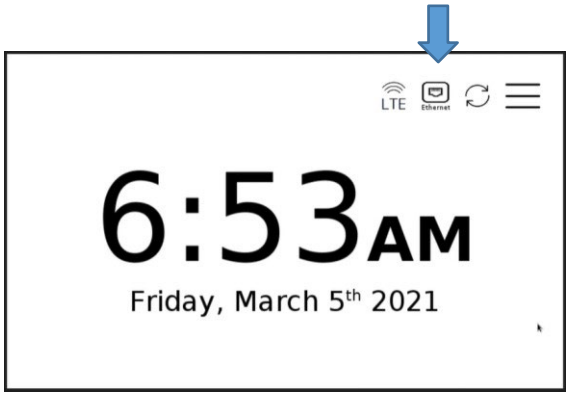


Figure 44 Ethernet (wired) backhaul selection from Home screen

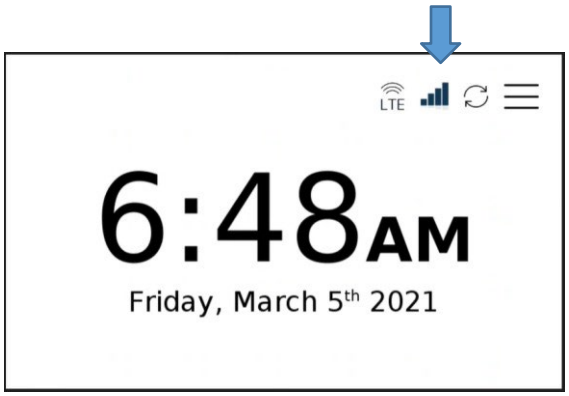


Figure 45 LTE backhaul selection from Home screen

The following status screen will be displayed when the Backhaul in use is Ethernet (Wired)

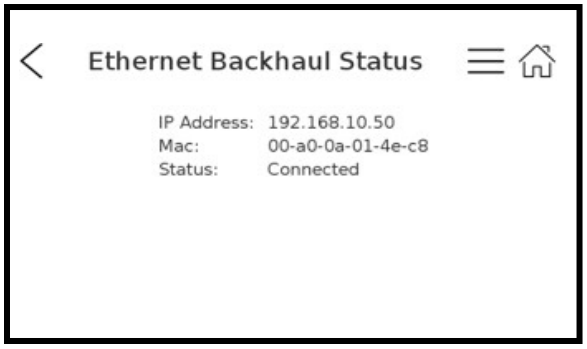


Figure 46 Ethernet (wired) backhaul status

The following status screen will be displayed when the Backhaul in use is LTE

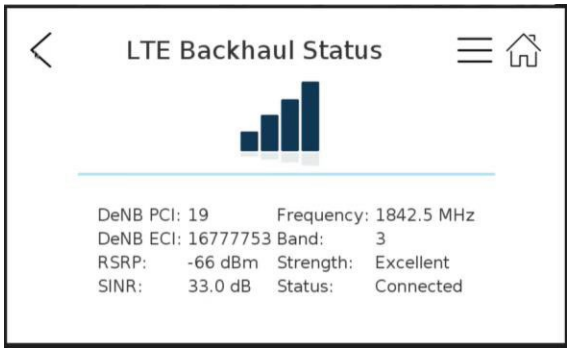


Figure 47 LTE backhaul status

Note: When inactive for approx. 10 secs you are returned to the Home screen Clock.

9 Error Screens

During normal operation, it is possible that AirUnity 588 unit could experience a failure scenario. These failure instances may at times be visible as generated error codes and messages on the screen for possible intervention purposes.

Once an Error or Warning screens is displayed – follow the message instructions to attempt to correct the issue.

This section displays examples of such possible error codes and their description messages with the corrective action to be taken and when to contact Customer care.

The following screens are examples of what can be displayed to alert you of possible issues.

9.1 Restart Required

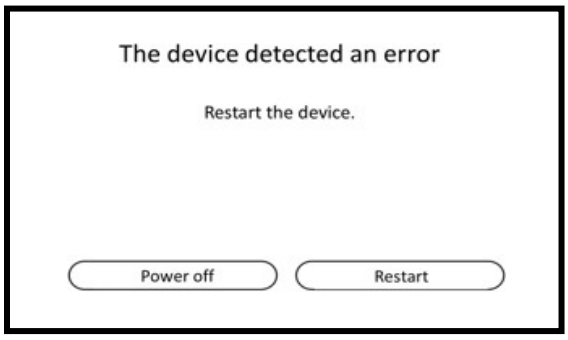


Figure 48: Restart

- Restart – restart the installation
- Power off – shut down the unit

9.2 Synchronization failure

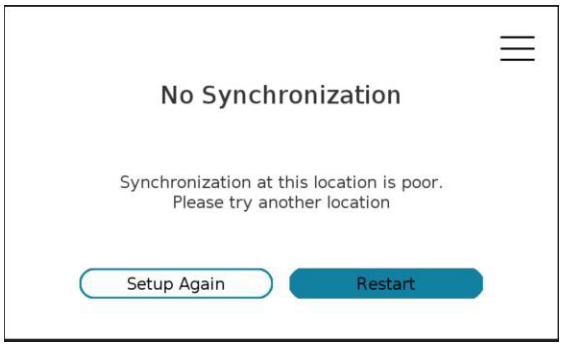
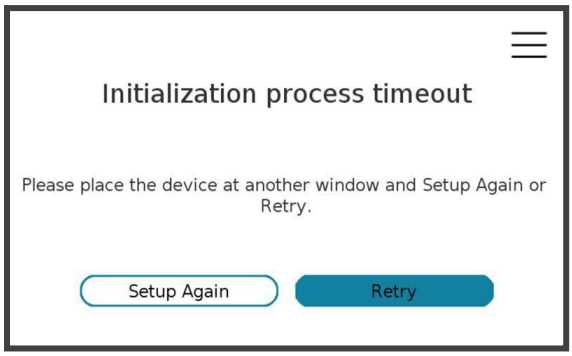


Figure 49: Unable to Operate at This Location – failure to Sync with Network

- Restart – the unit re-boots
- Setup Again – re-enter setup

9.3 Initialization failure



9.4 No Signal

10 Warnings and Cautions

10.1 Human Exposure to Radio Frequencies

The AirUnity 588 device should be located at a distance of at least 20 cm (7.87 in.) from all persons during normal operation.

10.2 Radio Interference

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to internal vehicle radio communications.

Please ensure a maximum separation between the AirUnity 588's antenna and other antennas.

10.3 Modifications

Any changes and modifications to this device that are not expressly approved by Airspan Networks may void the user's authority to operate the equipment.

10.4 General

- Only qualified personnel should be allowed to install, replace, and service the equipment.
- The device cannot be sold retail, to the general public or by mail order. It must be sold to operators.
- Installation must be controlled.
- Installation must be performed by licensed professionals.
- Installation requires special training. The AirUnity 588 unit should be installed ONLY by those who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void Airspan's product warranty and may expose the end user or the service provider to legal and financial liabilities. Airspan and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.
- The AirUnity 588 unit does not provide protection from hazard energy in case of single fault condition.
- Power supply shall be limited up to 5A in normal and single fault condition.

10.5 ⚠ Important Safety Instructions

- Read and Save these instructions
- This Installation Guide contains instructions and warnings that should be followed during installation, and operation.
- Failure to follow these instructions could cause bodily injury and/or product failure

10.6 Safety

1. Read this guide and follow all operating and safety instructions.
2. Supply cord is not shipped with the unit and is to be provided by user.
3. Static sensitive components inside - do not remove the lid or base: No user serviceable parts inside.
4. Position the power cord to avoid possible damage; do not overload circuits.
5. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.

6. Use only a damp cloth for cleaning. Do not use liquid or aerosol cleaners. Disconnect the power before cleaning.
7. It is the user's responsibility to install this device in accordance with the local electrical codes.
8. Installation of the AirUnity 588 unit should be performed by someone familiar with the product.
9. The circuit breaker where connected should be easily accessible in case you have to disconnect the device.
10. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

Note: Airspan products do not contain hazardous substances (as defined in UK Control of Substances Hazardous to Health Regulations 1989 and the Dangerous Substances Regulations 1990). At the end of any Airspan products life cycle, the customer should consult with Airspan to ensure that the product is disposed of in conformance with the relevant regulatory requirements.

10.7 Warning Symbols

The following symbols may be encountered during installation or troubleshooting. These warning symbols mean danger. Bodily injury may result if you are not aware of the safety hazards involved in working with electrical equipment and radio transmitters. Familiarize yourself with standard safety practices before continuing.

Caution, hot surface

Caution

Electro-Magnetic Radiation

DC

10.8 ⚠ FCC Statement

FCC Class B Digital Device Notice

The digital circuit of this device has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help

10.9 Service Information

Refer all repairs to qualified service personnel. Do not modify any part of this device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

a. The unit does not function after following the operating instructions outlined in this manual.
b. The product has been dropped or the housing is damaged.

Locate the serial number of the terminal and record this on your registration card for future reference. Also record the MAC address, located on the product sticker.

11 Ordering Information

Frequency Band (MHz)	Marketing P/N	Description
3550-3700 (B48) Access	U588F3U48A5DW0BA25DA	AirUnity588, AC PSU, Access: B48, Relay: B2 ,B4, B25

12 Maximum Output TX Total Power

Table 1: AirUnity 588 Maximum Output TX Total Power

Frequency Band (MHz)	TX (dBm)	EIRP (dBm)	Antenna Gain (dBi) - Typical	Comment
eNB				
B48: 3550-3700	23.0 23.0	33 33	10 +/- 1 10 +/- 1	Outdoor sector - dual polarized ±45° Indoor sector- dual polarized ±45°
Relay				
UE: TX/UL B4:1710-1755 **UE: RX/DL** B4: 2110-2155	23.0	30.5	4.5 +/-1.0 3.0 +/-1.0 2.5 +/-1.0	Outdoor Sector (rear panel) - dual polarized ±45° Side panel 1 – single polarised Side panel 2 – single polarised
UE: TX/UL B2:1850-1910 B25: 1850-1915 **UE: RX/DL** B2: 1930-1990 B25:1930-1995	23.0	31	5.0 +/-1.0 3.0 +/-1.0 3.0 +/-1.0	Outdoor Sector (rear panel) - dual polarized ±45° Side panel 1 – single polarised Side panel 2 – single polarised

Caution: Do not set maximum output TX power to higher than local regulations.

13 Power Supply

The AirUnity 588 is powered via an AC mains (line power) adapter which provides local DC power to the unit.

AC/DC power convertor supports:

- AC input voltage range 100-240V±10% at 50/60Hz
- DC output voltage range: 10V – 14V
- DC cable length: 1.5M (approx. 5 feet)

AirUnity 588 has a Max nominal power consumption of LTE BH: <61W Max-Nominal.

14 Product Overview

The AirUnity 588 is a combined LTE based small cell with LTE-based or Wired (Ethernet) backhaul within a single unit. The Wireless protocols that come with this product ensure data security and isolation from interference generated by other radio frequencies.

The AirUnity 588 unit supports MIMO antenna technology and high power output.

14.1 Management

- Software is upgraded either locally (via Ethernet) or remotely (OverTheAir)
- Designed for local and remote management via Netspan (WEB management).

14.2 AirUnity 588 eNB Frequency Ranges

The table below lists the frequency range of AirUnity 588 eNB units currently available. This table will grow as more models become available.

Table 2: Frequency Ranges

Frequency Band	Channel Bandwidth
48	10 & 20 MHz

15 Physical Description

This section provides a description of the components of the AirUnity 588:

- Dimensions
- Power Supply

15.1 AirUnity 588

Figure 50: AirUnity 588

15.1.1 Physical Dimensions

The table below lists the physical dimensions of the AirUnity 588.

Table 3: AirUnity 588 Physical Dimensions

Parameter	Value
H x W x D	214 mm (8.43 In) x 312 mm (12.28 in) x 95 mm (3.74 in)
Weight	<3.6Kg

15.1.2 Digital Display (Touch Screen)

The AirUnity 588 unit has 5.17” digital touch display to allow user to interact with the device and obtain following information:

- Power on
- Backhaul (UE Relay) status
- eNB status
- Number of end user(s) connected
- Location (GPS)
- Macro received signal level
- Best Location Indicator / Installation Instructions

The user interface provides information to enable the end user to determine the optimal location for the AirUnity 588 operation.

15.1.3 SIM Card

The AirUnity 588 provides a standard SIM card holder for the operator-provided SIM.

15.1.4 USB Ports

The physical USB ports located on the side of the unit only provide support to charging of 1.5A +. These ports do not support communications.

15.1.5 Ethernet Port

RJ45 - 1 Gbps - Located on bottom of unit.

15.2 Synchronization

The AirUnity 588 contains an integrated GPS receiver, which is used for position location, location timing and synchronization.

15.2.1 Synchronization Compliance

The AirUnity 588 meets the synchronization requirements as defined in TS 36.104 and TS 36.133.

15.2.2 Frequency Accuracy

For Frequency stability, the same source is used for RF frequency and data clock generation. The modulated carrier frequency of the eNodeB has an accuracy of ±0.05ppm observed over a period of one subframe (1ms).

15.3 Phase Accuracy

Phase accuracy, (required for TD-LTE interference coordination and for both TD-LTE and FDD-LTE when considering MBSFN or ABS) is 1µs or better.

15.4 Power Supply

The AirUnity 588 is powered via an AC mains (line power) adapter which provides local DC power to the unit:

AC/DC power convertor supports:

- AC input voltage range 100-240V±10% at 50/60Hz
- DC output voltage range: 10V – 14V
- DC cable length: 1.5M (approx. 5 feet)

15.5 GPS Antenna

Table 4: GPS Antenna

Band	Function	Location
1575 MHz	GPS	Internal

Table 5: GPS Antenna Parameters

Parameter	
GPS Band	L1
Frequency	1575.42 ±3
Polarization	Right Hand Circular
Gain at 90° Elevation	4dBic

16 Hardware Security

16.1 Factory Generation of Device Key

Each device has a private key and associated certificate which is used to authenticate itself when initiating communications. This private key is generated in the factory, and so is the corresponding vendor certificate. This capability is necessary in order to support large scale “plug and play” deployments.

This device key is stored on the AirUnity 588 to allow it to authenticate to the network. If the private key is compromised, then the device can be masqueraded by an attacker towards the operator’s core network. Therefore, it is stored in an encrypted form.

16.2 Unused Port Security

Unused interfaces on the SoCs within AirUnity 588 are protected against attack by ensuring that the corresponding pins are not connected to tracks on the circuit board. In addition to this hardware protection the device drivers within the SoCs which service these ports are disabled.

16.3 Tamper Detection

Simple tamper detection is provided in AirUnity 588 by the use of tamper-evident label covering the SIM holder.

The SoC within the AirUnity 588 unit supports secure boot. Enabling secure boot ensures that only trusted software will run on the SoCs internal to AirUnity 588.

AirUnity 588 supports FCAPS capabilities including the following:

- Configuration Management
- Inventory Management
- Fault Management
- Performance Management
- Software Management
- Diagnostics

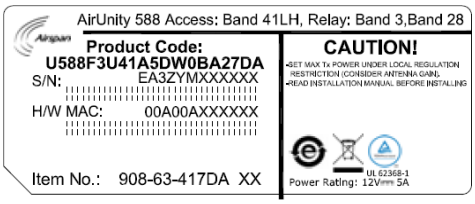
AirUnity 588 is managed remotely via Airspan's NMS (Netspan) using SNMP and supports management using a default IP address. The NMS is automatically detected via "plug and play" procedures implemented in the AirUnity 588 and Netspan software.

Airspan's Netspan node management system supports management of all Airspan products.

17 Standards Compliance

17.1 TUV Marking

The AirUnity 588 bears the TUV conformance mark.



Product conformity is based upon the AirUnity 587 which is FCC Approved with the addition of Radio testing according for Band 3 and Band 28 according to 3GPP TS36.521-1 and 3GPP TS36.521-2

The AirUnity 588 product is not CE marked.

17.2 Environmental

AirUnity 588 is designed to meet the following environmental requirements:

- ETSI EN 300-019-1-3 Operational (weather protected locations)
- ETSI EN 300-019-1-1 Storage (weather protected, not temperature controlled locations)
- ETSI EN 300-019-1-2 Transportation

Table 6: Environmental Compliance

Type	Details	Standard Compliance
Operating temperature	-5°C to 45°C	ETSI 300 019 1-3 Class 3.1
Operating humidity	5% - 85% non-condensing	ETSI 300 019 1-3 Class 3.1
Storage temperature	-20°C to 70°C	N/A
Storage humidity	5% - 95% non-condensing	N/A
Rain and dust ingress protection	IP40	N/A
Operational altitude	70-106 kPa as well as: From -60m to 1800m @ 40°C From 1800m to 4000m @ 30°C	N/A
Solar radiation	700 W/m2	ETSI 300 019 1-3 Class 3.1

17.3 EMC

The AU588 is not CE marked.

Formal compliance testing was performed on the parent product AirUnity 587 ,the key difference being the UE Relay card of the AirUnity 5898 supports B3/B28 whereas the AirUnity 587 supports Relay Band 41.

The parent product (AirUnity 587) conforms to EMC requirements as specified by ETSI EN 301 489-1 V1.9.2 (2011-09) Class A, as well as EN 301 489-4 V1.4.1 (2009-05) and IEC61000-4 series. .

17.4 Safety

The AU588 is not CE marked.

Formal compliance testing was performed on the parent product AirUnity 587 ,the key difference being the UE Relay card of the AirUnity 5898 supports B3/B28 whereas the AirUnity 587 supports Relay Band 41.

The parent product Air Unity 587 conforms to IEC 60950, UL 60950, and EN 60950-1:2006.

In addition to this specification, the following specifications covering human exposure to radio frequency electromagnetic fields are also satisfied:

- **EN 50385:2002** Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 - 40 GHz). General public.
- **EN 50401:2006** Product standard to demonstrate the compliance of fixed equipment for radio transmission (110 - 40 GHz) intended for use in wireless telecommunication networks with the basic restrictions or the reference levels related to general public exposure to radio frequency electromagnetic fields, when put into service.

17.5 ROHS & WEEE Compliance

- The chemical content of the equipment and its packaging meets the EU ROHS directive - 2002/95/EC (ROHS) – compliant with ROHS6 (up to 2009)
- The WEEE symbol is present on the product label as per the requirements of European directive 2002/96/EC

17.6 Reliability and Maintenance

The AirUnity 588 contains no user-serviceable parts. The following reliability data assumes worst case requirements. Overall reliability is improved when considering the dual transceivers as a redundancy factor (this consideration is not included in the quoted figures).

Average Mean Time between Failures (MTBF) = 10 years.

18 Customer Care Help Desk

Airspan's *Customer Care Help Desk* offers prompt and efficient customer support services.

Note: To avail Airspan's *Customer Care Help Desk* support, you must be a registered user and must have a valid support contract. To register, click here and fill the **Registration** form.

To create and update issue logs, send e-mails to Customer Care Help Desk. Once you submit your issue, the system generates a new issue and sends an issue number for your reference. The system uses this issue number to categorize and store e-mails under the appropriate issue.

To help *Customer Care Help Desk* identify your issue, include the issue number and your *Customer Care Helpdesk* account details in all further communications.

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18.1 Airspan Encourages Comments

Airspan welcomes any feedback and suggestions that help to improve the quality of the documentation. Send your feedback to documentfeedback@airspan.com.

A Abbreviations

Term	Expansion
3GPP	3rd Generation Partnership Project, responsible for LTE
ANR	Automatic neighbour relation
BER	Bit Error Rate
CA	Carrier aggregation
CN	Core Network
CP	Cyclic Prefix
CQI	Channel quality indicator
dB	Decibel. A logarithmic unit used to describe a ratio (such as power ratio in radio telecommunications)
dBm	An abbreviation for the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW). It is used as a convenient measure of absolute power because of its capability to express both very large and very small values in a short form
DHCP	Dynamic host configuration protocol
DL	Downlink
DNS	Domain name server
ECGI	E-Utran Cell Global identifier
EMS	Element Management System (Node management system – Netspan)
eNodeB	Evolved Node B, is the element in E-UTRAN of LTE
ESP	Encapsulating Security Payloads (ESP) provide confidentiality, data-origin authentication, connectionless integrity, an anti-replay service (a form of partial sequence integrity), and limited traffic-flow confidentiality
E-UTRAN	Evolved Universal Terrestrial Radio Access Network, is the air interface of 3GPP's Long Term Evolution
FDD	Frequency-Division Duplexing. A transceiver mode where the transmitter and receiver operate at different carrier frequencies
FQDN	Fully qualified domain name
GPS	Global Positioning System
HO	Handover
IPsec	Internet Protocol Security is a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session
LED	Light Emitting Diode
LTE	Long Term Evolution
MAC	Medium Access Controller – responsible for several functions such Scheduling, Packet (De) Multiplexing, etc…
MCS	Modulation and Coding Scheme
MIMO	Multiple-Input Multiple-Output
MME	Mobility Management Entity is the key control-node for the LTE access-network. It is responsible, among other things for idle mode UE tracking and paging procedure including retransmissions
MTBF	Mean Time Between Failures
NAS	Non access stratum
NDT	Network derived timing (synchronisation source)
NTP	Network time protocol
NRT	Neighbour relations table
OFDMA	Orthogonal Frequency-Division Multiple Access (OFDMA) is a multiple access version of OFDM digital modulation scheme, used for eNodeB transmissions to UEs
PDCP	Packet Data Convergence Protocol. A Sub-Layer in LTE responsible for Security, IP Header (De) Compression, etc…
PDU	Protocol data unit
PPS	Pulse per second (ref: synchronization accuracy)
PTP	Precision Time Protocol is used to synchronize clocks throughout a network. In this document, PTP is referring to IEEE1588-2008 protocol
QAM	Quadrature Amplitude Modulation
QCI	QoS Class identifier
QOS	Quality of service
QPSK	Quadrature Phase Shift Keying
RB	Resource Block
RF	Radio frequency

Term	Expansion
RLC	Radio Link Control. A Sub-Layer in LTE responsible for Ack/Nack, error correction, packet reordering, etc…
ROHS	Restriction Of Hazardous Substances
RRC	Radio Resource Control. A Sub-Layer in LTE responsible for Broadcast of system information, paging, security functions, radio bearer control, etc…
RRM	Radio Resource Management is used to cover all functions that are related to the assignment and sharing of radio resources among UEs
RSRP	Reference signal received power
RSSI	Received signal strength indicator
SC-FDMA	Single-Carrier FDMA is a frequency-division multiple access scheme, dealing with the assignment of multiple users to a shared communication resource. Used in LTE for UE transmissions to the eNodeB
SDR	Software Defined Radio
SINR	Signal to interferer Noise Ratio
SN	Serial number
SON	Self-Organising Network
TDD	Time-Division Duplexing. A transceiver mode where the transmitter and receiver operate on the same carrier frequency
TCP	Transmission control protocol
TM	Transmission mode
ToD	Time of Day
UE	User Equipment. The end user in LTE
UL	Uplink
VLAN	Virtual local area network
VoLTE	Voice over LTE
WEEE	Waste Electrical and Electronic Equipment